CLAIMS

We claim:

1. A process of forming a nitride film on a semiconductor substrate, comprising:

exposing a surface of the substrate to a rapid thermal process to form the nitride film.

2. The process according to claim 1, wherein the nitride film is a silicon nitride film for selectively blocking silicide formation for a resistor, and wherein the rapid thermal process comprises exposing a surface of a doped polycrystalline silicon region or doped silicon region to a rapid thermal nitride deposition.

3. The process according to claim 2, wherein the silicon nitride film has a thickness of about 100 Å or less.

4. The process according to claim 2, wherein the rapid thermal nitride deposition comprises:

exposing the doped polycrystalline silicon region or doped silicon region to a temperature above about 700°C for a period of time of about two minutes or less.

5. The process according to claim 4, wherein the silicon nitride film has a thickness of about 100 Å or less.

6. The process according to claim 2, wherein the rapid thermal nitride deposition is carried out in a processing chamber at a temperature of about 775°C, at a pressure of about 100 torr, with the semiconductor substrate is rotated at a rate of about 35 rpm, and with SiH_4 and NH_3 gasses being introduced into the processing chamber at a ratio of about 40:4.

7. The process according to claim 1, wherein the rapid thermal process comprises a rapid thermal chemical vapor deposition.

8. The process according to claim 7, wherein the rapid thermal chemical vapor deposition is carried out at a temperature of about 700°C to about 750°C for a period of time of about 30 seconds to about 5 minutes.

9. The process according to claim 7, wherein the barrier nitride film has a thickness of about 100 Å to about 150 Å.

10. The process according to claim 7, wherein the nitride film comprises a barrier to oxidation for a bipolar transistor.

11. The process according to claim 7, wherein the nitride film comprises a conformal film.

12. The process according to claim 11, wherein the nitride film comprises a barrier on a CMOS FET.

13. The process according to claim 11, wherein the rapid thermal chemical vapor deposition is carried out at a temperature of about 600°C to about 800°C.

13. The process according to claim 11, wherein the rapid thermal chemical vapor deposition is carried out at a temperature of about 600°C to about 700°C.

14. The process according to claim 11, wherein the rapid thermal chemical vapor deposition is carried out at a temperature of about 700°C to about 710°C.

15. The process according to claim 11, wherein the

rapid thermal chemical vapor deposition is carried out at a temperature of about 700°C.

16. The process according to claim 11, wherein the rapid thermal chemical vapor deposition is carried out at a temperature of about 700°C to about 775°C.

17. The process according to claim 11, wherein the rapid thermal chemical vapor deposition is carried out at a temperature of about 680°C or greater.

18. The process according to claim 17, wherein the process is carried out at a pressure of about 100 torr.

19. The process according to claim 11, wherein the rapid thermal chemical vapor deposition is carried out for a period of time of about 1 minute to about 4 minutes.

20. The process according to claim 11, wherein the film has a conformality of greater than about 90%.

21. The process according to claim 11, wherein the film has a conformality of about 95% to about 100%.

22. The process according to claim 11, wherein the process is carried out at a pressure of about 100 torr.

23. The process according to claim 11, wherein the process is carried out at a pressure of about 250 torr or greater.

24. The process according to claim 11, wherein the process is carried out at a pressure of about 100 torr to about 250 torr.

25. The process according to claim 11, further comprising introducing NH_3 gas into a processing chamber that the rapid thermal chemical vapor deposition is carried out in.

26. The process according to claim 25, wherein the NH_3 gas is introduced into the processing chamber at a rate of about 4 liters per minute.

27. The process according to claim 11, further comprising introducing SiH_4 gas into a processing chamber that the rapid thermal chemical vapor deposition is carried

out in.

28. The process according to claim 27, wherein the SiH_4 gas is introduced into the processing chamber at a rate of about 40 sccm.

29. A method of forming a resistor, comprising:

selectively blocking silicide formation over a doped polycrystalline silicon region or doped silicon region by forming a region of a silicon nitride film utilizing a rapid thermal nitride deposition after formation of device source/drain implants and completion of activation anneals; and

forming a contact on either side of the blocked region to form a current path through the blocked region.

30. A blocked silicide resistor structure, comprising:

a silicide blocking region comprising a silicon nitride film arranged over a region of doped polycrystalline silicon or doped silicon, wherein the silicon nitride film has been formed by a rapid thermal nitride deposition;

a region of a silicide adjacent opposite sides of the silicon nitride film; and

a contact overlying each of the adjacent silicide regions;

wherein the resistor overlies device source/drain implants.

31. The resistor structure according to claim 30, wherein the adjacent silicide regions include a metal silicide.

32. The resistor structure according to claim 30, wherein the metal silicide is selected from the group consisting of titanium silicide and cobalt silicide.

33. The resistor structure according to claim 30, wherein the silicon nitride film has a thickness of about 100 Å or less.

34. The resistor structure according to claim 30, wherein the resistor structure is formed on cobalt silicide based structures.

35. A bipolar transistor structure, comprising:

a nitride barrier layer formed by a rapid thermal

chemical vapor deposition.

36. A CMOS FET structure, comprising:

a conformal nitride barrier film formed by a rapid thermal nitride deposition.